

Appln no. 10/668,753
Amendment dated October 14, 2005
Response to Office Action of June 14, 2005

Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

1. (currently amended) A structured abrasive article comprising:
 - (a) a backing having a front face;
 - (b) a plurality of abrasive composites on the front face, each of the abrasive composites comprising:
 - (i) a plurality of ceramic abrasive particles having an average particle size of ~~at least 85~~ about 100-400 micrometers; and
 - (ii) an organic constituent comprising radiation curable binder, the organic constituent occupying 15-40 wt-% of the abrasive composite; the composites having a height, measured from the front face of the backing, of at least 500 micrometers;wherein the abrasive article produces a first cut rate and a first surface finish at a first time and a second cut rate and a second surface finish at a second time, the first time and the second time being separated by at least 20 minutes;
wherein the second cut rate is no greater than 50% less than the first cut rate.
2. (original) The structured abrasive article according to claim 1, wherein the second cut rate is no greater than 30% less than the first cut rate.
3. (original) The structured abrasive article according to claim 2, wherein the second cut rate is no greater than 15% less than the first cut rate.
4. (canceled)
5. (currently amended) The abrasive article according to claim 1, wherein the ceramic abrasive particles have an average particle size of about ~~100-400~~ 300 micrometers.

Appln no. 10/668,753

Amendment dated October 14, 2005

Response to Office Action of June 14, 2005

6. (original) The abrasive article according to claim 1, wherein the composites have a height, measured from the front face of the backing, of at least 600 micrometers.
7. (original) The abrasive article according to claim 6, wherein the composites have a height, measured from the front face of the backing, of at least 750 micrometers.
8. (previously presented) The abrasive article according to claim 1, wherein the abrasive composite comprises faces that are defined at least partially by a parabolic function.
9. (canceled)
10. (previously presented) The abrasive article according to claim 1, wherein the ceramic abrasive particles comprise ceramic abrasive particles that have been modified with at least one rare earth oxide modifier.
11. (previously presented) The abrasive article according to claim 1, wherein the ceramic abrasive particles comprise ceramic abrasive particles that have been modified with an oxide of at least one of yttrium, neodymium, lanthanum, cobalt, and magnesium.
12. (original) The abrasive article according to claim 1, wherein the ceramic abrasive particles are seeded ceramic alumina.
13. (original) The abrasive article according to claim 1, wherein the ceramic abrasive particles are non-seeded ceramic alumina.
14. (currently amended) A method of grinding a surface, the method comprising:
 - (a) providing a structured abrasive article comprising a plurality of abrasive composites on the front face, each of the abrasive composites comprising:
 - (i) a plurality of ceramic abrasive particles having an average particle size of ~~at least 85~~ about 100-400 micrometers dispersed in a binder; and
 - (ii) having a height, measured from the front face of the backing, of at least 500 micrometers;

Appln no. 10/668,753
Amendment dated October 14, 2005
Response to Office Action of June 14, 2005

- (b) grinding the surface at a first time to obtain a first cut rate and a first surface finish; and
- (c) grinding the surface at a second time at least 20 minutes after the first time to obtain a second cut rate being no greater than 50% less than the first cut rate.

15. (original) The method according to claim 14, wherein grinding the surface at a second time comprises:

- (a) grinding the surface at a second time to obtain a second cut rate being no greater than 30% less than the first cut rate.

16. (original) The method according to claim 15, wherein grinding the surface at a second time comprises:

- (a) grinding the surface at a second time to obtain a second cut rate being no greater than 15% less than the first cut rate.

17. (original) The method according to claim 14, wherein grinding the surface at a second time comprises:

- (a) grinding the surface at a second time 30 minutes after the first time.

18. (currently amended) A structured abrasive article comprising:

- (a) a backing having a front face;
- (b) a plurality of abrasive composites on the front face, each of the abrasive composites comprising:
 - (i) a plurality of ceramic abrasive particles having an average particle size of ~~at least 85~~ about 100-400 micrometers; and
 - (ii) an organic constituent comprising radiation curable binder, the organic constituent occupying 15-40 wt-% of the abrasive composite; the composites having a height, measured from the front face of the backing, of at least 500 micrometers;

Appln no. 10/668,753

Amendment dated October 14, 2005

Response to Office Action of June 14, 2005

wherein the abrasive article, when using Test Procedure I, produces a first cut rate at Cycle 1 and a second cut rate at Cycle 240, the second cut rate being no greater than 15% less than the first cut rate.

19. (currently amended) A structured abrasive article comprising:

- (a) a backing having a front face;
- (b) a plurality of abrasive composites on the front face, each of the abrasive composites comprising:
 - (i) a plurality of ceramic abrasive particles having an average particle size of ~~at least 85~~ about 100-400 micrometers; and
 - (ii) an organic constituent comprising radiation curable binder, the organic constituent occupying 15-40 wt-% of the abrasive composite; the composites having a height, measured from the front face of the backing, of at least 500 micrometers;

wherein the abrasive article, when using Test Procedure II produces a first cut rate at Cycle 1 and a second cut rate at Cycle 12, the second cut rate being no greater than 50% less than the first cut rate.

20. (currently amended) A structured abrasive article comprising:

- (a) a backing having a front face;
- (b) a plurality of abrasive composites on the front face, each of the abrasive composites comprising:
 - (i) a plurality of ceramic abrasive particles having an average particle size of ~~at least 85~~ about 100-400 micrometers; and
 - (ii) an organic constituent comprising radiation curable binder, the organic constituent occupying 15-40 wt-% of the abrasive composite; the composites having a height, measured from the front face of the backing, of at least 500 micrometers;

wherein the abrasive article, when using Test Procedure III produces a first cut rate at Cycle 1 and a second cut rate at Cycle 60, the second cut rate is no greater than 30% less than the first cut rate.

Appl'n no. 10/668,753
Amendment dated October 14, 2005
Response to Office Action of June 14, 2005

21. (currently amended) A structured abrasive article comprising:
- (a) a backing having a front face;
 - (b) a plurality of abrasive composites on the front face, each of the abrasive composites comprising:
 - (i) a plurality of ceramic abrasive particles having an average particle size of ~~at least 85~~ about 100-400 micrometers; and
 - (ii) an organic constituent comprising radiation curable binder, the organic constituent occupying 15-40 wt-% of the abrasive composite; the composites having a height, measured from the front face of the backing, of at least 500 micrometers;

wherein the abrasive article, when using Test Procedure III, has a cut rate decrease over 60 cycles of no more than 50% of a comparative cut rate decrease,

wherein the comparative cut rate decrease is obtained by a conventional coated abrasive with make and size coats and gravity deposited fused aluminum oxide abrasive particle agglomerates using Test Procedure III.

22. (currently amended) A method of making an abrasive article comprising:
- (a) providing a backing having a front face;
 - (b) applying a plurality of abrasive composites on the front face, each of the abrasive composites comprising:
 - (i) a plurality of ceramic abrasive particles having an average particle size of ~~at least 85~~ about 100-400 micrometers; and
 - (ii) an organic constituent comprising radiation curable binder, the organic constituent occupying 15-40 wt-% of the abrasive composite; the composites having a height, measured from the front face of the backing, of at least 500 micrometers.

23. (currently amended) The method of making the abrasive article according to claim 22, wherein the step of applying comprises:

- (a) providing a slurry comprising a binder precursor and the plurality of ceramic abrasive particles dispersed therein;

App'n no. 10/668,753

Amendment dated October 14, 2005

Response to Office Action of June 14, 2005

- (b) providing a production tool having a plurality of cavities therein;
- (c) coating the slurry into the cavities;
- (d) contacting the slurry with the backing front face;
- (e) at least partially curing the binder precursor having the plurality of ceramic abrasive particles therein to form an at least partially cured binder having the plurality of ceramic abrasive particles therein; and
- (f) removing the at least partially ~~slurry or the~~ cured binder having the plurality of ceramic abrasive particles therein from the production tool.

24. (currently amended) The method according to claim 23, wherein the step of at least partially curing the binder precursor having the plurality of ceramic abrasive particles therein is done before the step of removing the ~~slurry or the~~ at least partially cured binder having the plurality of ceramic abrasive particles therein from the production tool.

25. (canceled)

26. (original) The method according to claim 23, wherein the step of coating the slurry into the cavities is done before the step of contacting the slurry with the backing front face.

27. (original) The method according to claim 23, wherein the step of contacting the slurry with the backing front face is done before the step of coating the slurry into the cavities.

28. (original) The method according to claim 23, wherein the step of providing a slurry comprises:

- (a) providing a slurry comprising a binder precursor and ceramic abrasive particles having an average particle size of at least 200 micrometers.

29. (currently amended) The method according to claim 23, wherein the step of providing a slurry comprises:

- (a) providing a slurry comprising a binder precursor and ceramic abrasive particles having an average particle size of ~~100-400~~ about 300 micrometers.

Appln no. 10/668,753
Amendment dated October 14, 2005
Response to Office Action of June 14, 2005

30. (canceled)

31. (previously presented) The method according to claim 23, wherein the step of providing a slurry comprises:

- (a) providing a slurry comprising a binder precursor and ceramic abrasive particles wherein the ceramic abrasive particles have been modified with at least one rare earth oxide modifier.

32. (previously presented) The method according to claim 23, wherein the step of providing a slurry comprises:

- (a) providing a slurry comprising a binder precursor and ceramic abrasive particles, wherein the ceramic abrasive particles have been modified with an oxide from at least one of yttrium, neodymium, lanthanum, cobalt, and magnesium.

33. (original) The method according to claim 22, wherein the step of applying a plurality of abrasive composites on the front face comprises:

- (a) applying a plurality of abrasive composites, each of the abrasive composites having a height, measured from the front face of the backing, of at least 750 micrometers.

34. (previously presented) The method according to claim 22, wherein the step of applying a plurality of abrasive composites on the front face comprises:

- (a) applying a plurality of abrasive composites, each of the abrasive composites having faces that are defined by a parabolic function.

35. (new) The structured abrasive article according to claim 18, wherein the ceramic abrasive particles have an average particle size of about 300 micrometers.

36. (new) The structured abrasive article according to claim 19, wherein the ceramic abrasive particles have an average particle size of about 300 micrometers.

Appln no. 10/668,753

Amendment dated October 14, 2005

Response to Office Action of June 14, 2005

37. (new) The structured abrasive article according to claim 20, wherein the ceramic abrasive particles have an average particle size of about 300 micrometers.

38. (new) The structured abrasive article according to claim 21, wherein the ceramic abrasive particles have an average particle size of about 300 micrometers.